

Frequency of Ossicles Erosion on Mastoid Exploration in Chronic Suppurative Otitis Media with Middle Ear Cholesteatoma

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ABSTRACT

Aim: To assess the frequency of ossicles erosion on mastoid exploration in chronic suppurative otitis media with middle ear cholesteatoma.

Study Design: Cross-sectional descriptive study.

Place and Duration of Study: This study was carried out in the ENT Department, Mayo Hospital, Lahore affiliated with King Edward Medical University Lahore. One year study (10th February 2013 to 10th February, 2014).

Methods: 120 patients were admitted through non-probability purposive sampling technique via outpatient and emergency at the Department of ENT, Mayo Hospital, Lahore. Patients were selected after fulfilling the inclusion criteria. All the data was analysed by SPSS version 18. Quantitative data like age was analysed using mean and standard deviation. Qualitative data including gender and presence or absence of ossicular erosion was analysed using percentages and frequencies.

Result: A total of 120 patients of chronic suppurative otitis media with middle ear cholesteatoma were included in this study. Out of these 120 patients 80(66.7%) were males and 40(33.3%) were females. Male to female ratio was 2:1. Mean±standard deviation of age group was 21.2±11.9 years. Radical mastoidectomy was performed in 112 patients (93.3%) and modified radical mastoidectomy was performed in 8 patients (6.7%). Ossicles erosion in chronic suppurative otitis media with middle ear cholesteatoma observed in 102 patients (85%) and 18 patients (15%) had no ossicles erosion.

Conclusion: Cholesteatoma a non-malignant destructive lesion is the commonest finding in operated cases of chronic suppurative otitis media. Most of the studied cases showed ossicles erosion specially incus. Early diagnosis and treatment can prevent intracranial and extra cranial complications. Treatment of cholesteatoma is surgery with the primary goal to eradicate disease and provide a safe and dry ear with hearing improvement. Radical mastoidectomy is a procedure of choice for the treatment of extensive cholesteatoma. It was also observed that cholesteatoma is more common in low socio-economic groups.

Keywords: Ossicles erosion, Mastoid exploration, chronic suppurative otitis media, Cholesteatoma

INTRODUCTION

Cholesteatoma is a destructive lesion with an abnormal collection of viable and desquamated squamous epithelium in the middle ear or mastoid air cells¹. Cholesteatoma may be considered as a three dimensional connective tissue structure, usually in the form of a sac and frequently conforming to various spaces of middle ear, attic and mastoid. Cholesteatoma has the capacity for independent and progressive growth at the expense of underlying bone and has a tendency to recur after surgical removal². Though cholesteatomas are more frequently found in the middle ear and mastoid, the disease can occur in the external ear canal and very rarely it may present as a lump on the side of a patient's head eroding the squamous temporal bone with intracranial extension³.

Erosion of ossicles occurs in three stages, pumicing, pitting and cavitation⁴, basically there are four major ossicular defects that may result from erosion by cholesteatoma giving rise to deafness in the patients. The most common is involvement of only the long process of incus with intact malleus and stapes⁵. The second most common defect is erosion of the supra structure of the stapes as well as loss of incus. Third, the cholesteatoma growing into the middle ear involves the malleus handle which may require its removal along with the incus, however the stapes remains intact. Finally there may be loss of all ossicles except the stapedial foot plate. Erosion of the long process of the incus by cholesteatoma is the most common defect of the ossicular chain. The reason for this is delicate structure and location rather than its tenuous blood supply⁶.

Incus is most common bone which is eroded in chronic suppurative otitis media with middle ear cholesteatoma. A cholesteatoma is a destructive lesion with 3 dimensional epidermal structure capable

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of independent growth, replaces middle ear mucosa, erodes the underlying tissue and tends to recur after removal and results into otorrhea, bone destruction, hearing loss, facial nerve paralysis and intra-cranial complications. Incus is a part of ossicular chain, when it will be eroded due to cholesteatoma leading to conductive hearing loss⁷.

A study describing 55 patients of chronic suppurative otitis media shown the presence of cholesteatoma associated with existence of two or more affected ossicles, but erosion of ossicles was not present in studied patients. On comparing the ossicles separately incus was involved in 90% of cases⁸. Eighty cases of chronic suppurative otitis media with middle ear cholesteatoma were studied. Sixty cases were found only with cholesteatoma and in 20 cases cholesteatoma with granulations were observed. Incus bone erosion was seen in 30 cases 37.5%⁹. Conductive hearing loss is a common complication of cholesteatoma as ossicular chain erosion occurs in 30% of cases. Erosion of the lenticular process may produce a conductive hearing loss as high as 50dB¹⁰. Twenty five patients with history of progressive hearing loss were examined and results were compared with preoperative and intraoperative findings to evaluate the diagnostic value of digital volume tomography for incus erosion. Intact incus was found in 13 cases and predicted incus erosion was verified in 12 cases after surgery.

A cholesteatoma is destructive lesion which erodes the underlying tissues and causes resorption, destruction of incus bone and resulting hearing loss.⁷ A study comprising 23 patients with identification of incus in all cases, 10 includes covered with a thin mucosa layer, 11 buried in granulation tissue and 2 were joined to surrounding bone. In Pakistan the frequency of ossicles erosion due to cholesteatoma has not been studied in detail. But foreign studies have been done on the status of ossicles in middle ear cholesteatoma⁹.

MATERIALS AND METHODS

This Cross-sectional descriptive study was carried out in the ENT Department, Mayo Hospital, Lahore affiliated with King Edward Medical University Lahore during one year from 10th February 2013 to 10th February 2014. Sampling technique was non-probability purposive sampling. All diagnosed cases of chronic suppurative otitis media are included in the study. All patients with Central perforation and subtotal perforation, upper respiratory tract disease and unfit for anaesthesia were excluded from the study.

One hundred and twenty patients were admitted through via outpatient and emergency at the

Department of ENT, Mayo Hospital, Lahore. Patients were selected after fulfilling the inclusion criteria. All the information was collected on a Proforma regarding the patient's demographic profile i.e. name, age, sex, address and registration number. After taking the informed consent surgery was performed. During surgery the operative findings were noted in order to observe the ossicular erosion after middle ear cholesteatoma in chronic suppurative otitis media.

RESULTS

A total number of 120 patients with chronic suppurative otitis media with middle ear cholesteatoma were included. Out of these 80(66.7%) were males and 40(33.3%) were females. Male to female ratio was 2:1 (Table 1). The patients shown in table 2 were divided into six age groups. In the first age group, patients aged 1-10 years 14(11.7%), in second age group, patients aged 11-20 years 60(50%), in third age group, patients aged 21-30 years 26(21.7%) in fourth age group, patients aged 31-40 years 6(5%), in fifth age group, patients aged 41-50 years 12(10%) and in the sixth age group, patients aged >50 years 2(1.6%) were observed. Mean±standard deviation of age group was 21.2±11.9 years (Table 2). Table 3 shows that the procedure of radical mastoidectomy was performed in 102 patients (93.3%) and that of modified radical mastoidectomy was performed in 8 patients (6.7%). Ossicles erosion in chronic suppurative otitis media with cholesteatoma was found in 102 patients (85%) and out of these 18 patients (15%) had no ossicles erosion (Table 4).

Table 1: Gender distribution of cases (n=120)

Gender	Frequency	%age
Male	80	66.7
Female	40	33.3

Male to female ration 2:1

Table 2: Age distribution of cases (n = 120)

Age (years)	Frequency	%age
1-10	14	11.7
11-20	60	50.0
21-30	26	21.7
31-40	6	5.0
41-50	12	10.0

Mean±SD: 21.2±11.9

Table 3: Procedures performed in all cases (n = 120)

Procedure	Frequency	%age
Radical mastoidectomy	112	93.3
Modified radical mastoidectomy	8	6.7

Table 4: Ossicles erosion in all cases (n = 120)

Ossicles erosion	Frequency	%age
Yes	102	85
No	18	15

DISCUSSION

Chronic suppurative otitis media is a persistent disease with insidious onset and can cause dangerous life threatening complications if left untreated or treated inadequately. All the 120 cases of chronic suppurative otitis media presented with the common complaints of ear discharge. During surgery, cholesteatoma alone and cholesteatoma with granulations appear to be the commonest finding.

Cholesteatoma was more common in males (66.7%) than in females (33.3%) [Table 1]. The finding regarding the male female ratio being 2:1 correlates with that of another study showing that the chronic suppurative otitis media with cholesteatoma occurs more frequently in males¹¹.

Majority of patients i.e., 60(50%) were in the age group of 11-20 years of their ages, next 26(21.7%) in the age group of 21-30 years, 14(11.7%) in the age group of 1-10 years, 12(10%) in the age group of 41-50 years, while only 6(5%) patients were 31-40 years of age (Table 2). In this study old patients were found less indisposed than young adults of age 11-20 years. The findings however did not match with those of Cruz et al¹² who showed that peak incidence was in age group of 10-15 years. The finding regarding the age of the patients correlates with another study which showed almost same incidence of age relation. That study stated that the peak incidence of the disease was in the age group between 21 to 30 years¹³.

In this study 85% cases showed ossicles erosion while 15% cases showed intact ossicles. The long process of incus was the most common portion involved. This finding correlates with another study¹⁴. The damage of incus as the most common ossicular defect signifies its tenuous blood supply. The second reason may be that erosion of the ossicles depends upon the site of the main focus of the disease process. The pathology was found to be mainly in the posterosuperior quadrant.

It is revealed that majority of patients belonged to poor communities living in rural or slum areas of the cities where infections were more common due to unhealthy diet, less affordability and poor hygiene. The management of middle ear cholesteatoma was prompt removal with the aim to arrest the bone erosion and potential threat to life while anticipating a clear, dry, odorless inactive cavity, open to the external meatus.

Both techniques i.e. radical mastoidectomy and modified radical mastoidectomy were used. Radical mastoidectomy was performed in 112 cases (93.3%) and modified radical mastoidectomy was performed in 8 cases (6.7%).

With regard to cholesteatoma surgery the canal wall down technique was preferred. In this technique cholesteatoma can be more thoroughly removed by wide access exposure and exteriorizing the cavity in contrast to a closed technique i.e. canal wall up technique, where the chance of residuality often persists. By exteriorizing the mastoid cavity, the keratin that accumulates may not create any problem by establishing self-cleaning properly leading to its easy removal postoperatively. This study, therefore, suggests that the open (canal wall down) methods are more convenient and even safer for patients suffering from chronic suppurative otitis media with middle ear cholesteatoma.

CONCLUSION

Cholesteatoma a non-malignant destructive lesion is the commonest finding in operated cases of chronic suppurative otitis media. Most of the studied cases showed ossicles erosion specially incus. Early diagnosis and treatment can prevent intracranial and extra cranial complications. Treatment of cholesteatoma is surgery with the primary goal to eradicate disease and provide a safe and dry ear with hearing improvement. Success depends almost as much on the ability of the body to heal and preserve the reconstruction as it does on the surgeon's skill. Radical mastoidectomy is a procedure of choice for the treatment of extensive cholesteatoma. The commonest presenting feature of chronic suppurative otitis media with cholesteatoma was ear discharge. It was also observed that cholesteatoma is more common in low socio-economic groups and slums of the cities where infections are more common due to malnutrition and poor hygiene.

REFERENCES

1. Anthony W. Anatomy and ultrastucture of the human ear. In: Kerr AG, ed. Scott-Brown's otolaryngology. 8th ed. Philadelphia: Butterworth & Co. 1997.
2. Youngs R. Chronic suppurative otitis media cholesteatoma. In: Ludman H. Diseases of ear. 5th ed. Philadelphia: Elsevier, 2004; 386-415.
3. Ballantyne J, Grooves J. Scott-Brown's disease of ear nose and throat. 12th ed. London: Butterworth, 2008.
4. Wong J, Stoney P, Hawke M. Ossicular erosion by cholesteatoma: investigation by scanning electron microscopy utilizing a new preparation technique. J Otolaryngol 1991; 210: 319-24.
5. Viswanatha B, Sarojamma, Roopashree TJ. Mastoid cholesteatoma: a result of metaplasia. Indian J

- Otolaryngol Head Neck Surg. 2013 Dec;65(Suppl 3):665-9. doi: 10.1007/s12070-011-0390-8. Epub 2011 Dec 4.
6. Olszewska E, Wagner M, Bernal-Sprekelsen M, Ebmeyer J, Dazert S, Hildmann H, Sudhoff H. Etiopathogenesis of cholesteatoma. *Eur Arch Otorhinolaryngol* 2004; 261: 6-24.
 7. Olszewska E. Otology and neuro-otology, cholesteatoma. *Eur Arch Otorhinolaryngol* 2004; 261: 1-8.
 8. Dornelles C, Sady S. daCosta SS, Meurer L, Schweiger C. Some considerations about acquired adult and pediatric cholesteatomas. *Rev Bras Otorrinolaringol* 2005; 71:536-46.
 9. Siddiqui R. Surgery for otitis media with cholesteatoma, canal up versus canal down procedures. *J Liaquat Univ Med Health Sci* 2005; 25: 64-7.
 10. Quinn FB Jr, Ryan MW. Cholesteatoma. *Grand Rounds Presentation* 2005; 115: 1734-40.
 11. Amjad M, Abbas N. Incidence of cholesteatoma in various age, sex and socioeconomic groups. *Ann King Edward Med Coll* 1998; 4: 65-6.
 12. Cruz OL, Takeuti M, Caldas-Neto S, Miniti A. Clinical and surgical aspects of cholesteatoma in children. *Ear-Nose-Throat-J* 1990; 69: 530-5.
 13. Memon MA, Matiullah S, Ahmed Z, Marfani MS. Frequency of un-safe chronic suppurative otitis media in patients with discharging ear. *J Liaquat Uni Med Health Sci* 2008; 7:102-5.
 14. Rupa V, Raman R. Chronic suppurative otitis media: complicated versus uncomplicated disease. *Acta Otolaryngol* 1991; 111: 430-5.